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NATURAL DISASTER REDUCTION: WARNING SYSTEMS

Technical session

Addendum

Risk management and assessment for natural hazards

Summary of presentation by Professor Dr. Erich Plate, Director, Institute for Hydrology and Water Resources Planning, Germany

1. Risk management is a methodology that provides a framework for a logical approach to disaster management. It is presented as a chain of action, each stage of which is well defined and based on traditional engineering and management practices. The links of the chain are described verbally, as well as through the concepts of risk analysis. They are illustrated by references to flood and wind hazards.

2. Risk assessment is the first step in a risk management scheme, where the hazards are identified (e.g., floods and their recurrence intervals) as the basis for decisions on flood protection schemes. Hazard identification is, however, not enough; a flood occurring in a natural wilderness will have only limited consequences, whereas a flood in a heavily populated area may lead to extreme disasters. Human involvement is a necessary prerequisite for a disaster. This is quantified by means of risk analysis, in which the hazards as well as the consequences of the occurrence of an extreme natural event are considered.

3. The combination of hazard and consequences is the risk, which for natural hazards is ideally represented by risk maps. Very often, such maps suffice as a decision aid for risk mitigation measures, but the decision made depends also on the second step in the risk analysis chain: the evaluation of the

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risk. In order to be able to assess the consequences in monetary terms, or in terms of potential loss of life, one must consider the options that are available for disaster mitigation. Options range from comprehensive (and costly) structural solutions to complete absence of structural solutions, where mitigation is effected only by individual actions, such as reactions to more or less organized forewarnings, or individual protection against financial losses through insurance. The risk posed by a natural hazard is not an absolute criterium for deciding on the action to be taken; its reduction is one among many social goals, and the financial and other resources available must be suitably allocated for many different purposes. In the end, the final decisions on large-scale risk mitigation measures are made only if other needs are considered less pressing - an attitude that applies to Governments as well as to individuals. Whatever the decisions that are made, it can be stated that an additional protection against the threat from natural hazards is obtained by preparedness against disasters: structural strengthening of threatened buildings, preparation of emergency supplies, provision of medical services and, last but not least, training of people who are to be active in disaster mitigation, are all measures which complete the chain of risk management. Decisions on risk management for protection against large natural disasters are made according to criteria which are rooted in human factors depending on the social and political decision environment, as well as on financial constraints.

4. Much effort is given by the scientific community to the development of an analytical theory of risk assessment. The process of analytical risk analysis is an important step in the procedure of determining objective decision criteria for disaster management. The method, in spite of its rational foundation is not, however, used as much as it should be. It is a method which should work well in situations where probabilities can be obtained from relative frequencies. It is of little value in cases of rare events. Yet, it has been applied mostly to rare events and, because of its lack of credibility there, it is not considered useful in cases where it should work well as a valuable decision tool.

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